

P a t e n t   c l a i m s

1.

- A method for separation of CO<sub>2</sub> from the combustion gas from a thermal power plant  
5 fired with fossil fuel, the method comprising the following steps;
- a) cooling and mixing the combustion gas from the thermal power plant with air;
  - b) compressing the combustion gas – air mixture;
  - c) reheating the compressed gas from step b) by using it as an oxygen containing gas for combustion of natural gas in a pressurized combustion chamber to  
10 form an exhaust gas;
  - d) regulating the supply of natural gas and oxygen containing gas in the combustion chamber so that the exhaust gas contains less than 6 % rest oxygen;
  - e) keeping the temperature in the exhaust gas between 700 and 900 °C by  
15 generation of steam in tubular coils in the combustion chamber;
  - f) cooling the the exhaust gas and bringing it in contact with an absorbent absorbing CO<sub>2</sub> from the exhaust gas to form a low CO<sub>2</sub> stream and an absorbent with absorbed CO<sub>2</sub>;
  - g) heating the low CO<sub>2</sub> stream by means of heat exchanges against the hot  
20 exhaust gas leaving the combustion chamber; and
  - h) expanding the heated low CO<sub>2</sub> stream in turbines.

2.

- The method according to claim 1, wherein the absorbent used in step f) with absorbed  
25 CO<sub>2</sub> is regenerated to form a CO<sub>2</sub> rich stream and regenerated absorbent.

3.

- The method of claim 1 or 2, wherein the steam generated for cooling the pressurized combustion chamber in step e) is expanded in turbines to generate power.

4.

A separation plant for separation of the combustion gas from a thermal power plant (100) into a CO<sub>2</sub> poor stream and a CO<sub>2</sub> rich stream, the plant comprising an air / combustion gas mixer, a combustion chamber (6) for further combustion of the mixture of air and combustion gas from the power plant (100), a supply line (9) for supply of hydrocarbon fuel to the combustion chamber (6), means for cooling the exhaust gas from the combustion chamber (6), a contact device (13) for bringing the cooled exhaust gas in contact with an absorbent for absorption of CO<sub>2</sub> where a CO<sub>2</sub> poor stream, that is released into the atmosphere, is generated, a regeneration loop (19, 18, 43, 20) for regeneration of the absorbent and generation of a CO<sub>2</sub> rich stream, and an associated power plant producing power from the heat produced in the combustion chamber (6).

5.

Plant according to claim 4, additionally compressor(s) (2, 2') for compressing the combustion gas from the power plant (100) and turbine(s) (15, 15') for expansion of the CO<sub>2</sub> poor stream before it is released into the atmosphere.

6.

Plant according to claim 4, additionally comprising heat exchangers (11, 8) for heating the CO<sub>2</sub> poor stream by heat exchanging against the exhaust gas from the combustion chamber (6) before the CO<sub>2</sub> poor stream is expanded over turbine(s) (15, 15').

7.

Plant according to any of the claims 4 to 6, additionally comprising lines (82, 83, 85, 87) for transferring heat as hot water or steam between the power plant and the separation plant.

8.

A combined thermal power plant and separation plant for separation of the combustion gas from the thermal power plant in a CO<sub>2</sub> rich and a CO<sub>2</sub> poor fraction, comprising a thermal power plant fired by carbon or a hydrocarbon and a separation plant according to claim 5.

9.

A combined plant according to claim 8, wherein the power plant is fired by a hydrocarbon, preferably by natural gas.

A method for separation of CO<sub>2</sub> from the combustion gas from a thermal power plant fired with fossil fuel, wherein the combustion gas from the thermal power plant is used as cooled, compressed and reheated by combustion of natural gas in a combustion chamber to form an exhaust gas, where the exhaust gas is cooled and brought in contact with an absorbent absorbing CO<sub>2</sub> from the exhaust gas to form a low CO<sub>2</sub> stream and an absorbent with absorbed CO<sub>2</sub>, and where the low CO<sub>2</sub> stream is heated by means of heat exchanges against the hot exhaust gas leaving the combustion chamber before it is expanded in turbines, is described. A plant for performing the method and a combined plant is also described.